CLAIMS

1. Method for the outer loop of the power control system of a mobile communications system with a cellular infrastructure, characterised by:

the reception of a signal from the base or mobile station; and

based on this signal, the calculation of the desired signal to interference target ratio for the outer loop of the power control system. The method includes the following steps:

estimating the desired signal to interference ratio of the received signal; and

estimating the following statistical moments of the desired signal to interference ratio: typical deviation of the slow or lognormal fading component, typical deviation of the Gaussian distribution describing the joint statistical variation of all interfering signals and, in the case of a direct beam existing between the emitter and the receiver, the Rice factor, which is the quotient of the deterministic component and the random component of the desired signal; and

based on the above statistical moments and on a specification of the outage probability, calculating the margin of the desired signal to interference ratio by the Newton-Raphson iteration method; and
based on the aforementioned margin, obtain the desired signal to interference target ratio for the said outer loop.

2. Method according to claim 1, in which using the numerical approximation for the probability distribution function corresponding to the desired signal to interference ratio of a communication without a direct beam between the emitter and the receiver, the Newton-Raphson method is applied to obtain the margin of the said ratio that will fulfil an outage probability specification, for statistical conditions determined by the typical deviation of the slow or lognormal fading component and the typical deviation of the Gaussian distribution that describes the joint statistical variation of all the interfering signals.

3. Method according to claim 1, in which using the numerical approximation for the probability distribution function corresponding to the desired signal to interference ratio of a communication with a non-zero deterministic component corresponding to the existence of a direct beam between the emitter and the receiver, the Newton-Raphson method is applied to obtain the margin of the said ratio that will fulfil an outage probability specification for statistical conditions determined by the typical deviation of the slow or lognormal fading component and the typical deviation of the Gaussian distribution that describes the joint statistical variation of all the interfering signals and the Rice factor, which is the quotient between the deterministic component and the random component of the desired signal.

4. Method according to claim 2 in which by a numerical integration of the probability density function corresponding to the desired signal to interference ratio of a communication without a direct beam between the emitter and the receiver, an expression is obtained for the outage probability with given statistical conditions

(typical deviation of the slow or lognormal fading component and the typical deviation of the Gaussian distribution that describes the joint statistical variation of all the interfering signals), so that the aforementioned expression is suitable for a subsequent application of the Newton-Raphson method described in the said claim.

5. Method according to claim 2 in which by a numerical integration of the probability density function corresponding to the desired signal to interference ratio of a communication with a non-zero deterministic component corresponding to the existence of a direct beam between the emitter and the receiver, an expression is obtained for the outage probability with given statistical conditions (typical deviation of the slow or lognormal fading component, typical deviation of the Gaussian distribution that describes the joint statistical variation of all the interfering signals and the Rice factor, which is the quotient between the deterministic component and the random component of the desired signal) so that the aforementioned expression is suitable for a subsequent application of the Newton-Raphson method described in the said claim.

6. Apparatus for implementing the outer loop of the power control system of a mobile communications system with a cellular infrastructure according to claim 1, characterised by:

a receiver that receives the signal from the base station or mobile station and

a processor meant to implement a method for the outer loop of the power control system,

in which the processor estimates the following statistical moments of the desired signal to interference ratio; typical deviation of the slow or lognormal fading component, typical deviation of the Gaussian distribution that describes the joint statistical variation of all the interfering signals and the Rice factor, which is the quotient between the deterministic component and the random component of the desired signal; based on these statistical moments and on a outage probability specification calculates the margin of the desired signal to interference ratio by the Newton-Raphson iteration method; and from this margin obtains the desired signal to interference target ratio for the aforementioned outer loop.

7. Apparatus according to claim 6 that also includes an emitter which sends the power control information to the base station if the apparatus is in the mobile station, or to the mobile station if the apparatus is in the base station.

8. Apparatus according to claim 6 in which the processor calculates the desired signal to interference ratio by the Newton-Raphson iteration method, which fulfils a given outage probability specification for statistical conditions characterised by the estimated statistical moments.